

ABSTRACT OF THE DISCLOSURE

A method of fabricating a MOSFET device with a multiple T-shaped gate has the following steps. A substrate with an active region and a non-active region is provided, wherein the active region has a plurality of trenches, and the non-active region has a plurality shallow trench isolation structures. A thin insulating layer and a conducting layer are formed in the trenches. The conducting layer is defined to form a gate. The device is implanted with first ions. Then, the device is further implanted with second ions by using a mask, wherein the mask expose the trenches of the active region, and the opening of the mask is wider than the trench. The MOSFET device has at least the following structures. There is a substrate with an active region and a non-active region, wherein the active region has a plurality of trenches and the non-active region has a plurality of shallow trench isolation structures. There is a multiple T-shaped gate with a first part and a second part, wherein the first part is formed between two trenches on the substrate and the second part is formed in the trenches of the active region. There is a source/drain region with a shallow doped region and a deep doped region. The multiple T-shaped gate increases the channel width of the MOSFET device and decreases the short channel effect of the high integrity ICs.

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